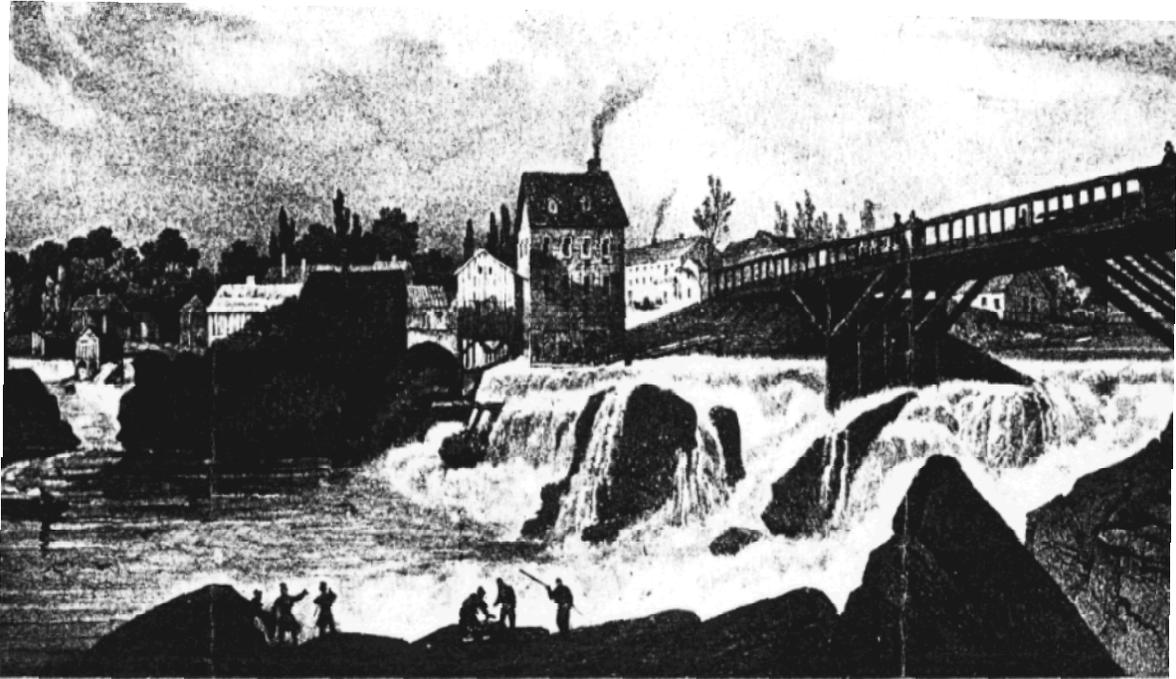


AN HISTORICAL ASSESSMENT OF ANADROMOUS FISH IN THE BLACKSTONE RIVER



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**Final Report to the Narragansett Bay Estuary Program, the
Blackstone River Valley National Heritage Corridor
Commission, and Trout Unlimited**



A photograph of Pawtucket Falls as seen today, showing the dam over the falls.

Acknowledgements

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Abstract

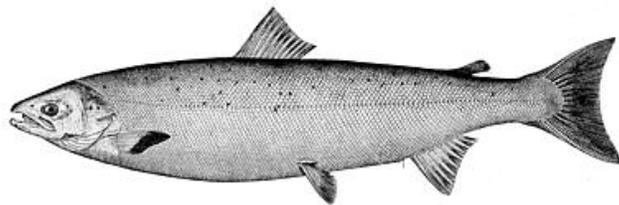
There is ample evidence in the literature of the historical existence of salmon, shad, and herring in the Blackstone River. Anadromous fish were present at least as far upstream as Mendon, Massachusetts. While it appeared that salmon disappeared sometime in the 1700s, shad and herring were caught into the 1800s. The decline of these species has been attributed to the construction of dams along the river. Early laws passed by the Rhode Island General Assembly sought to protect the fisheries by limiting weirs, requiring that dams be opened seasonally, and that bypasses be made for the migrating fish. However, as manufacturing became increasingly important along the river, a gradual shift occurred, and laws were passed favoring factory owners and industrialization over the fisheries. The preexisting laws protecting the fishery were not enforced. Fish bypasses became blocked with dams of their own, the dams were made higher, and the flow of the river was often reduced. Other factors contributing to the decline of anadromous fish were the building of bridges that narrowed the river, the discharge of manufacturing wastes and sewage into the river, and overfishing.

Reasons for An Historical Inquiry

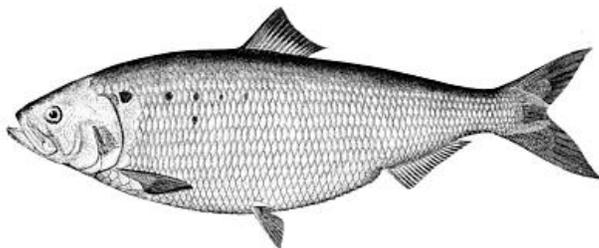
The public, as well as state and federal regulatory agencies, and many relevant local private groups have agreed that the restoration of the Blackstone River ecosystem, including its major species and their habitats, is a desirable and important goal. A first step in this restoration effort is to determine what species historically inhabited the river and the extent of their geographical range. As part of this effort, we were asked to investigate the historical presence of Atlantic salmon, *Salmo salar*, American shad, *Alosa sapidissima*, and river herring, (Alewife, *Alosa pseudoharengus*, and Blueback herring, *Alosa aestivalis*), in the Blackstone River. Figure 1 and Table 2 provide illustrations of these anadromous fish and list some of their characteristics.

Approach to the Study and Major Sources of Information

Documenting the presence of anadromous fish in the Blackstone River in the 17th and 18th centuries presented several challenges, particularly with the modest funds and limited time available. There were no scientific journals or monitoring data available for the period. Pawtucket did not have a newspaper until early in the 1800s and the Providence papers carried little information on events further up the river. The first Rhode Island Inland Fisheries Commission was established in about 1870, but by this time there were very few anadromous fish left in the river. Our research relied on court documents, written remembrances from the period, town records, books, and newspaper articles. We found much of this information in the RI State Archives, the RI Historical Society Library, the Spaulding House Research Library, the American Antiquities

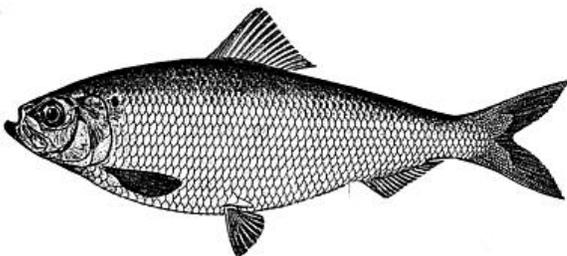


Salmon



Shad

River Herring:



Alewife

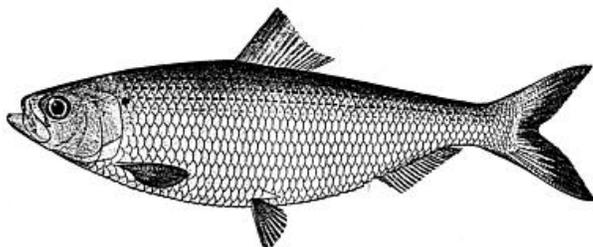
Blueback
herring

Figure 1. Drawings of anadromous fish historically present in the Blackstone River. (www.nefsc.nmfs.gov/photos/lineart/Species_By_Name/)

Table 1. Some characteristics of anadromous fish historically present in the Blackstone River

<u>Species</u>	<u>Size</u>	<u>Habits</u>
Atlantic salmon (<i>Salmo salar</i>)	up to 40 pounds up to 4 feet	Spawns in fall in shallow running waters of rivers and streams
American shad (<i>Alosa sapidissima</i>)	2 to 8 pounds 20 to 30 inches	Spawns in spring in shallow water of main stream with moderate flow
River Herring:		
Alewife (<i>Alosa pseudoharengus</i>)	less than 1 pound less than 12 inches	Spawns in late spring in still water areas (lakes and ponds)
Blueback herring (<i>Alosa aestivalis</i>)	less than 1 pound less than 12 inches	Spawns in spring in still or moving water

Society Library, and the Worcester Historical Society Library. In addition, books were obtained from numerous college and town libraries. We found the chapter by Gary Kulik in *The Countryside in the Age of Capitalist Transformation: Essays in the Social History of Rural America* particularly helpful as a starting point for our research.

Where possible, we cite primary sources, including books, petitions, laws, and acts written before the end of the 18th century when the anadromous fish were still abundant. In other instances, we have had to rely on somewhat more recent accounts written by individuals with first hand knowledge of the earlier abundance of fish, or by historians who wrote of that period a century or more after the fish had disappeared. Some references give very definitive accounts of the presence of these three species of fish, others imply their existence. The majority of our research effort was on the Rhode Island portion of the Blackstone.

The Blackstone River

The Blackstone River flows from just above Worcester, Massachusetts, southeasterly about 48 miles to the tidal Seekonk River in Rhode Island and into Narragansett Bay. Its main tributaries are Kettle Brook and the Quinsigamond, Mumford and West Rivers in Massachusetts, and the Mill, Peters and Branch Rivers in Rhode Island (Figure 2).

Introduction

It is not surprising that historical accounts tell of the existence of salmon, shad and herring in the Blackstone River. In fact, based on accounts of anadromous fish throughout New England, it would be surprising if they had not been in the Blackstone. In 1614, when John Smith explored New England, he observed that there was "...no river where there is not plentie of Sturgeon or Salmon or both" (1). Salmon came 300 miles up the Connecticut River to Colebrook, New Hampshire (2), and up the Ammanusouc branch of the Connecticut almost to Crawford Notch, New Hampshire (3). They came up the Merrimack River to its "farthest head" as late as 1792 and up the Kennebec River to its uppermost reaches (4). Thaddeus Norris, an early fish culturist, wrote that, "Shad, at one time, entered every river on our coast which furnished the requisite spawning beds...every tributary was crowded with them" (5). An eighteenth century farmer by the name of Matthew Patten kept a dairy of daily events that included fishing at the Amoskeg Falls in the Merrimack River. He wrote about the salmon, alewives, lamprey eels, and shad that were common there (6). William Wood in his *New England's Prospect* wrote in 1634 that, "Alewives came up to the fresh rivers to spawn in such multitudes it is almost incredible, pressing up such shallow waters as will scarce permit them to swim" (7). Likewise, John Josselyn in the records of his 17th century voyages to New England gives many accounts of rivers rich with salmon, herring and shad (8).

Based on these, and many other early accounts of salmon, shad, and herring in the rivers of New England, one would have to ask if there is any reason why these fish would not

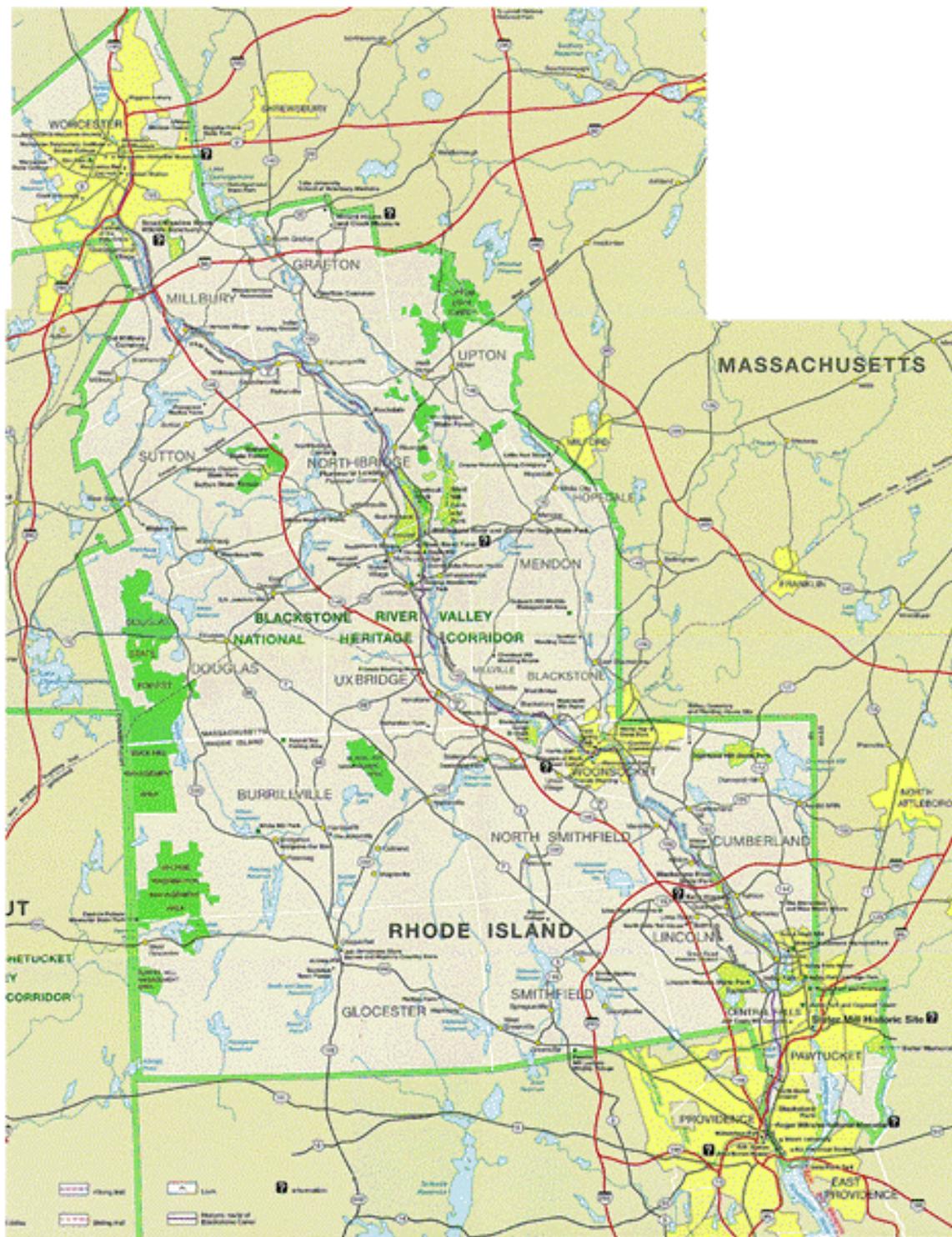


Figure 2. A contemporary map of the Blackstone River watershed. Available at: www.nps.gov/blac/ppmaps/blacmap%2Epdf.

also have been present in the Blackstone. The Blackstone has the “requisite spawning beds,” it is surrounded by rivers which had great numbers of these migrating fish, and the temperature and other conditions must have been adequate. Someone might argue that the falls at Pawtucket were too high, but when migrating fish came up the Connecticut River to Colebrook, New Hampshire, they managed to scale such “...impressive falls as those at South Hadley and Rockingham,” and they successfully traveled up the Kennebec River past the 16 1/2 foot Carratunk Falls (2). We will attempt to document that before human intervention, the falls on the Pawtucket were also not a barrier.

To begin, it is most important to realize how different the physical characteristics of the Blackstone were prior to the industrial era. Pawtucket Falls, which is now a formidable barrier to fish, looked very different then. The falls were not as high or as uniform, with lower areas where fish could pass. A dam built on top of the Pawtucket Lower Falls can be seen in the painting on the cover and in the photograph on page two of this report. Without the uniform high wall of the dam, the natural rocks of the falls are much lower with sections that would present much less of an obstacle to the fish runs. The same is true for the falls further up the river, such as at Woonsocket, seen in Figure 3. Historian David Benedict noted that, “...the Indians at first, and the white men after them, took much pains to smooth them [rocks at the Pawtucket Falls] off by battering down the projecting points, that the fish, in the time of their running, might the more easily ascend them, which feat they actually performed, before the lower dam was built or while it was very low” (9).

In addition, and of much significance, there was a natural passage around Pawtucket Falls. Before the Pawtucket Bridge was rebuilt about 1713 and the Pawtucket Lower Dam was constructed in 1718, a second, smaller stream known as Little River ran around the falls to the west of the river (10). This channel was formed by a current that diverged from the main river “a few rods” above the falls, pursuing a course around an elm tree and “running round the western side thereof, until it emptied into the river about 10 rods” below the Falls (11). Before these events, the river spread 50 feet further to the west (9) and anadromous fish were able to pass either around or over a much lower falls (12).

As we will describe later in this report, even after the first obstructions were built in 1713 and 1718, anadromous fish continued to migrate up the Blackstone. Fish passages were built to reopen Little River and to bypass dams. It was not until many years later, after numerous additional bridges, buildings, and dams were built, and the bypasses were filled with dams and water wheels, that the Blackstone became so obstructed that anadromous fish were no longer able to migrate up the river.

In this report, we have compiled evidence that salmon, shad, and herring once traveled upstream of Pawtucket Falls and migrated up the Blackstone River. First, we present historical accounts of Native Americans whose lives centered around the anadromous fish caught on the Blackstone in Rhode Island and Massachusetts, followed by reports from local historians. They told of the abundance of these fish and of locations as far up

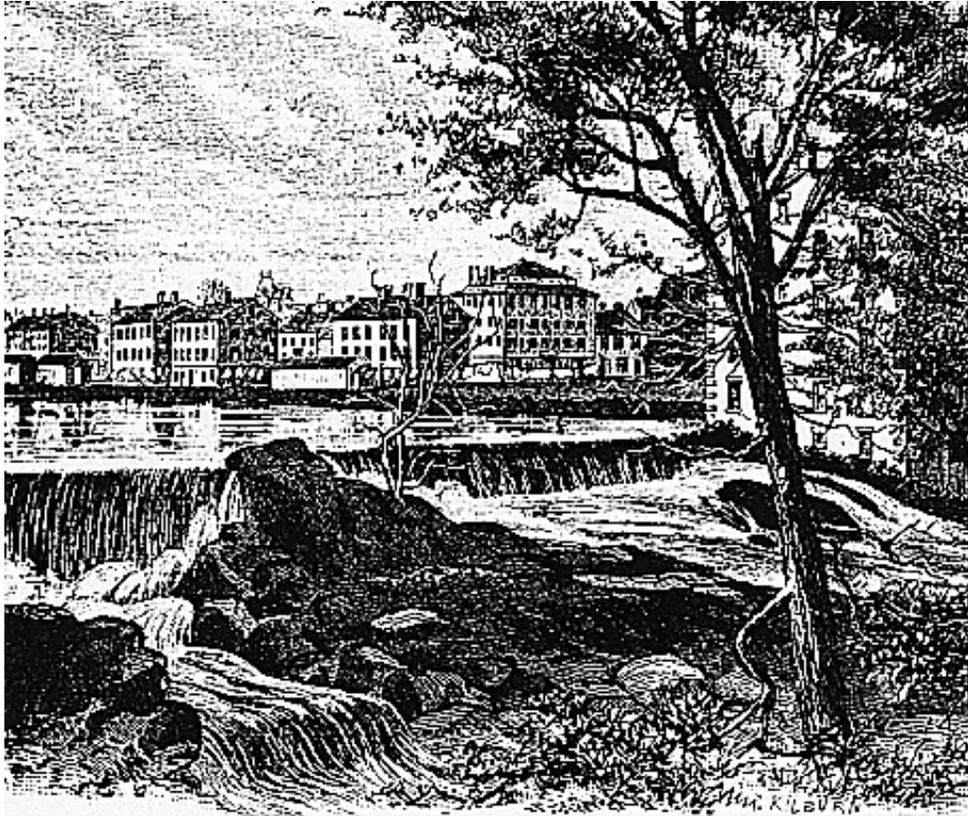


Figure 3. A sketch of the falls at Woonsocket as seen in the 19th century. (from *Picturesque Rhode Island* by W. H. Munro)

the Blackstone as Mendon, Massachusetts, where they were caught. As obstructions to the passage of migrating fish began to appear in the river in the eighteenth century, evidence of the existence of anadromous fish during this period was found mainly in the many petitions to, and laws and acts passed by, the Rhode Island legislature. We summarize some of the petitions, acts, and laws relating to anadromous fish. Other factors that lead to the decline and eventual disappearance of salmon, shad and herring will be discussed.

Anadromous Fish in the Blackstone: Early Years

There is a great deal of evidence in the literature documenting the existence of salmon, shad, and herring in the Blackstone River through the early 1700s. "Native American movements in Rhode Island tended to be along waterways...principally the Blackstone and Branch rivers. Temporary settlements were located near good fishing places, ...where salmon, shad, herring, and numerous other species of fish were caught" (13). The "good fishing places" were often located just below falls on the river, where fish congregated. The Narragansetts usually gathered at three falls, Pawtucket to the south, Valley to the north, and Central near the crossing at Roosevelt Avenue "...in great numbers to catch fish, which seasonally ran, up the river" (14-16). Since Valley Falls and Central Falls are both located upstream of Pawtucket Falls, it is presumed that the fish did pass either up or around Pawtucket Falls. Robert Greive reaffirmed this when he wrote, "...they (Indians) came to fish, and principally to capture the lordly salmon, which in its annual migrations found the foaming rapids of the waterfall no insurmountable obstacle to its pilgrimage up and down the stream" (17). Indians were said to have "stood on rocks below Pawtucket falls, and with their bows and arrows shot salmon as they attempted to leap the falls" (18). "Local residents recalled the sight of salmon struggling over the water fall (Pawtucket Falls) in a series of fitfull leaps" (19). The Indians obtained "vast quantities" of food from the Blackstone River in the form of migrating schools of salmon, shad, herring and "other aquatic varieties" (20, 21). These references, although some were written years later, convey a strong impression that substantial numbers of these three species of fish did, at one time, make it past the falls in Pawtucket.

Further upstream, in Massachusetts, the migrating fish were central to the lives of the Nipmuck (or "freshwater") Indians in Worcester county. The Nipmucks caught salmon and shad in "immense numbers" with scoop nets, spears, and arrows, and "...gathered at camp sites on the smaller streams up which alewives ran in the spring of the year" (22). Weirs were used to catch the fish as they descended to return to the sea. Fish in excess of their immediate needs were smoked. Daniel Gookin, a co-founder of Worcester, was appointed Superintendent of Indian Affairs in 1656 and wrote how, "...shad, eels, alewives a kind of herring" were frequently added to the Nipmuck's pottage (23).

The Nipmuck settlements shared three characteristics: a convenient fishing place, large fields for planting, and a level spot for wigwams and long-houses (22). Since their early settlements were located at Manchage (Sutton), Hassanamesit (Grafton), Squinshepauke (Mendon), Waeuntug (Uxbridge), and Pakachoog (Worcester), on the Blackstone River

and its tributaries, we think it can be assumed, although the evidence is circumstantial, that the Nipmucks caught anadromous fish at each of these locations (24).

How Abundant Were the Anadromous Fish?

Many accounts tell how important anadromous fish were to the lives of the colonial settlers near the Blackstone. They relied on these fish for food. The fact that they used them for fertilizer tells us “the supply of fish was greatly in excess of the needs of the population” (25).

Migrating fish were an important dietary staple in the colonial times and an important source of protein for the region’s farmers. The “great spring fish runs came just at a time when stocks of food were running low after the long New England winters” (19). In addition, “A special advantage to corn growing was that alewives to fertilize it found their way naturally far inland, up every stream with a pond at its head” (26). Historian Horace Keach in his book, *Burrillville; As it Was, and As it Is* related that, “Sometimes they [alewives and herring] were known to fill the streams at the fording-places so that it was difficult to cross while the shoal was passing. They were taken by the farmers in considerable quantities and used as fertilizer. An expert can catch a mess in a short time” (27). Alewives from the Blackstone were sold at 2s. a thousand in 1646 (28). Historian Erastus Richardson wrote that, “Aged people have informed me that before the construction of dams upon the river, salmon were so plentiful that, unless otherwise agreed upon, they formed the chief article in the farmer’s bill of fare” (29).

One of the more “official” references that was found was in a report prepared through the co-operation of the Commissioner of Fisheries and the Superintendent of the Tenth Census by George Brown Goode in which was written, “...there can be no doubt that one hundred years ago salmon fishing was an important food resource in Southern New England” (30). In one of the first reports of the Rhode Island Inland Fisheries Commission in 1869, it was stated, “Tradition tells us how abundant the salmon was. This generation has seen our streams filled with shad and herring....The principle rivers in the State which were formerly the home of the salmon, shad and herring, are the Blackstone, Pawtuxet and Pawcatuck, and these have become so obstructed with dams, that they no longer offer a passage to their upper waters, which nature prompts the fish to seek at spawning time” (31).

How Far up the Blackstone did Anadromous Fish Migrate?

Although it has been difficult to access the exact geographical extent of salmon, shad, and herring in the Blackstone, evidence in works, most of which were written in the 18th and 19th centuries, show that they extended at least as far upstream as Mendon, Massachusetts.

Eighteenth century historian Reverend Goodrich stated that, “Shad, alewives, and some other kinds of fish, had been wont to spawn near Woonsocket” (10). Erastus Richardson wrote in his *History of Woonsocket* that salmon formed the “chief article of diet” for farm

laborers along the Blackstone (29). David Benedict, another 18th century historian, stated that, “It is said to have been a fact beyond dispute that salmon, shad and other fish, the natives of Narragansett Bay, made their way quite up to the falls at Woonsocket, a distance of twelve miles beyond Pawtucket.... The small falls in the river upwards, which have since been turned to so good account for water power, by low dams and long ponds, were no hindrance to the finney tribes in their ascending progress” (9).

Horace Keach explained in his book, *Burrillville; As it Was, and As it Is*, "Many years ago, before the factory dams were built, certain kinds of fish came up our streams in the Spring, to deposit their spawn in our ponds, and in the Fall the new stock would descend to the sea. Alewives and Herring were among the varieties, and one of our ponds still bears the name of Herring Pond” (27). A 1795 map of Rhode Island by Caleb Harris (Figure 4) depicted “herring pond” (now called Spring Lake) in Burrillville, and Munro reaffirmed the existence of herring there when he wrote, “Herring Pond, of the delicious fish which once haunted its waters” (32). Keach also described another location in Burrillville, Wallum Lake or Sucker Pond, off of the Branch River (also called Allum Pond, Figure 4), which had, “considerable” quantities of alewives and herring (27).

Legislative records also convinced us of the historical existence of anadromous fish farther up the Blackstone. In April, 1748, residents living upstream of the Furnace Unity mill claimed before the local justice of the peace that the furnace dam “hindered the passage of fish” and spoke of the “annual fish runs” (19). This reference implied that anadromous fish traveled as far upland as Manville, 9 miles above Pawtucket Falls, where the Furnace Unity was located.

In a 1786 petition to the Rhode Island General Assembly, in which residents complained of dams built across a fish bypass, it was stated that, “ Many of the inhabitants of this and our sister state [Massachusetts] have sorely felt the want of Fish ...since said Trench is stopped in such a manner it is almost impossible for a fish to pass up” (33). This petition indicated that fish did pass up to the Massachusetts section of the Blackstone. Moreover, in a letter written to the Woonsocket Patriot in 1871, a Mendon, Massachusetts resident reported that a committee was formed at a Mendon town meeting to investigate why the “herring and other fish didn’t come up Great [Blackstone] River as usual”. The committee reported that, “...some folks had built a dam at Pawtucket so high that the fish couldn’t jump over it” (34).

Obstructions to Anadromous Fish Migrations

The river that was once known as the Seekonk, the Narragansett, the Patucket, the Neetmock, the Nipmuck, the Great, and, finally, the Blackstone (28) has undergone many changes. The first of many obstructions to anadromous fish migrations began in 1713 when the new Pawtucket Main Street Bridge was built (32, 35). The river was filled in with earth to support the bridge and to make a passage for carriages and wagons. In doing this, the river was narrowed considerably, becoming confined to the main channel and blocking Little River and thus the route that migrating fish could use to bypass the

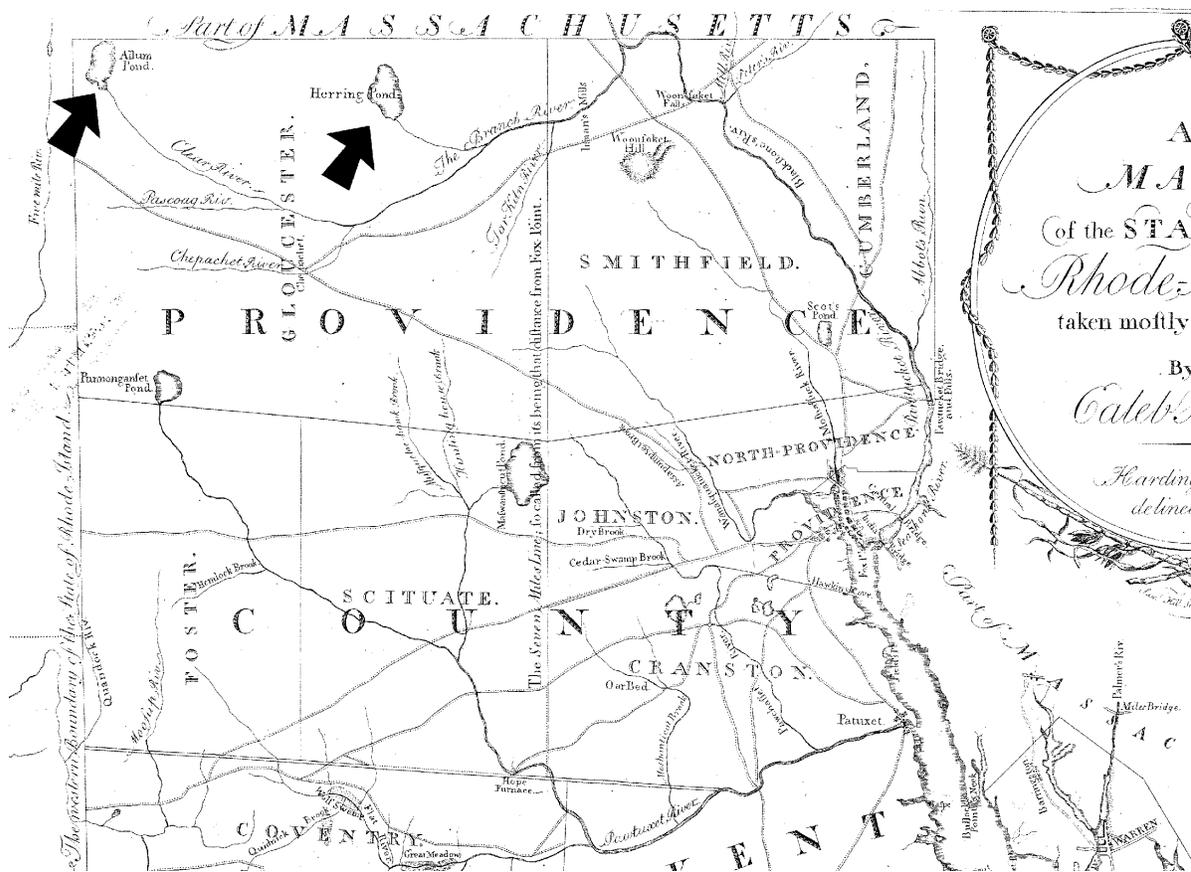


Figure 4. A section of a map of Rhode Island produced by Caleb Harris in 1795, with arrows inserted to indicate the locations of “Herring Pond” and “Allum Pond”. Anadromous fish were historically present in both ponds. (copy from the Spaulding House Research Library Collection)

falls. “Previous to this, the salmon, shad and herring could pass around the falls and supply the people on the river above with all the fish they needed” (12).

In addition, the first permanent dam to span the width of the river (known as the Pawtucket Lower Dam) was built around this time. Previously, the dams had been small, temporary, partial obstructions constructed of stone, gravel, moss, straw, and some wood placed from rock to rock (11, 36). Sidney Rider explained that the early dams which did not extend across the river could not obstruct fish, but that the lower dam built in Pawtucket about 1718 was an obstruction to fish (37). In a petition to the General Assembly many years later, residents spoke of the dam “...Erected upon Pawtucket falls in such manner as to prevent the fish passing up said Falls whereby a valuable Fishery was much Injured in said River”(38).

As a result of these two events, the narrowing of the Blackstone that blocked Little River in 1713, and the building of the first significant dam at Pawtucket Falls in 1718, a passage for fish became necessary. William Sargent therefore dug out and reopened Little River so that fish could by pass the falls. The town minutes of Mendon in 1718 state that Sargent built the trench so that, “fish may come up the river” (39). This passage was known as “Sargent’s Trench”. There were conflicting accounts of its success. In his “Opinion” in 1827, Judge Story stated, “It wholly failed in its purpose” (11). However, Edward Wilkinson recalled that, “this arrangement gave a full supply of fish to the people above” (12). Figure 5 shows the location of Sargent’s Trench, and illustrates how it provided a bypass around the Pawtucket Lower Dam and Falls.

Petitions to the General Assembly, Acts, and Laws Concerning Anadromous Fish

The historical evidence suggests that fish continued to travel up the Blackstone for a period of time, most likely using Sargent’s Trench and other fish passages. As additional obstacles to the passage of fish were constructed in the 18th century, many petitions from residents living near the Blackstone as far inland as Massachusetts, were heard by the General Assembly in Rhode Island. The petitioners were upset that obstructions interfered with their fishing privileges. During this same period, laws and acts were passed by the Rhode Island General Assembly to protect the passage of fish up the Blackstone. All of these petitions, laws, and acts implied that anadromous fish did migrate into the upper river at one time. The large number of petitioners who signed the petitions, and the responses by the General Assembly, make it apparent that there must have been a valuable resource in the river to protect. Some of the pertinent testimony and their historical settings are summarized below in chronological order. The first two presented (1719 and 1735) are state-wide general legislation, the rest specifically refer to the Blackstone River.

1719- In response to complaints about dams, a law was passed enabling town councils to preserve and improve fishing and to prevent obstructions from being constructed. Permission of the town council would be needed before construction of a dam if it interrupted fish migrations upstream. The General Assembly fully empowered each town

council to remove all obstructions made in rivers that may, “prejudice the inhabitants by stopping fish from going up the rivers they have been accustomed to” (40).

1735- An act in 1735 stated that any mill owner erecting a dam across a water where migratory fish normally pass had to provide a “good and sufficient Way through such Dam or Wear for the fish to pass and repass” that be opened during the spring runs, “between the 21st day of April and the 1st day of June annually, forever”. The Act also limited “the use of seines, or fishing nets, to four days a week during the spring run of fish” (41).

1741- Since a dam had been built across Sargent’s Trench which obstructed the passage of fish, a Grant of Privilege was made to residents of Smithfield and Grafton to grant “... full Liberty to dig a trench Round Pawtucket falls ...In order to give the fish a free Passage up Pawtucket River.” A later petition, of 1786 referred to the privilege granted in 1741. The new trench apparently was completed and was successful: “Which Trench was dug in the earth and through the rock by the Grantees. Whereby they Received great Benefit, as said river and its branches afforded plenty of fish that passed up said Trench” (33). This petition gives powerful evidence of fish upstream of Pawtucket Falls when it clearly states that plenty of fish passed through the trench around Pawtucket Falls and went not only up the river, but up its branches.

1748- In April of 1748, residents living upstream of the Furnace Unity, which was located 9 miles above Pawtucket Falls at Manville, claimed that, “...the furnace’s dam hindered the passage of fish” (42). Gristmills and saw mills did not need to operate continuously, but now blast furnace mills “were customarily put in blast in the spring,” for months at a time, “...in the midst of the annual fish runs,” creating another impediment to fish passage during the critical spring period. The Judge agreed with the petitioners and ordered that, “the said Dam should be broken and a way made through the same” in time for next spring’s migration of fish (19).

1761- By the 1760’s, a second dam had been built in Sargent’s Trench, which resulted in more petitions to the General Assembly. John Dexter of Cumberland, along with sixteen others asked that a lottery be authorized for, “...the purpose of making a passage through the falls for fish” since, a “...great many fish of several kinds” entered the river below the falls, but could not easily pass upstream, for “...there is nothing after passing said falls to obstruct their passing, to the head of said River” (43, 44). Permission was granted by the General Assembly in 1761 for a lottery, to raise money for making a passage around Pawtucket Falls, “so that fish of almost every kind who chose fresh water at certain seasons of the year may pass with ease.” The Assembly later noted that this lottery had worked, and it had demonstrated “public utility” since it benefited farmers above the falls, “especially the poorer Sort of people” (19).

1773- An act was passed by the legislature entitled “An Act making it lawful to break down and blow up the rocks at Pawtucket Falls, to let fish pass up” (45). Rocks were

blown up, broken down and removed. By 1774, fishways had been built on both sides of the river at Pawtucket Falls, and fishing continued to “prove valuable” (36).

Further up the river, at John Arnold’s dam at Woonsocket, the “obstruction problem” was also solved, this time “ through the building of a trench through which fish could pass” (46).

1774- Mill owners requested that the 1773 law be repealed. The Assembly said the law had been misunderstood and since “ many disadvantages” had happened, a new law was enacted that “no rocks be blown up” without the direction or permission of a newly appointed committee (45). The committee consisted of Stephen Hopkins, Darius Sessions and Moses Brown, all people with mill interests. This is said to mark the turning point in the rising importance of manufacturing as compared with fishing and agriculture, which up to that point had been dominant” (43).

1786- Petitions in June and September 1786 stated that the trench built as a result of a 1741 Grant of Privilege “Suffered a Dam to be made across said Trench [round Pawtucket falls] whereby the fish are wholly obstructed from passing up the Same and many of the Inhabitants of this and our Sister State have Sorely felt the want of fish and as Said falls are so Rapid that it is almost impossible for a fish to pass up them we consider ourselves aggrieved that Said Trench is stopped in such a manner.” The petitioners asked that a lottery be granted, “in Opening a Trench Round Said Falls, in the place they shall adjudge most Convenient” or by “increasing the width and depth of the present Ditch.” They asked that a committee be set up to “see the works completed as the fish may Pass up Said River without any obstruction” (33).

1787- An act was proposed to regulate the fishery in “ a trench or ditch” which the Records of the State of Rhode Island state “has been opened to form a water course round the westerly side of Pawtucket Falls to communicate with the river above and below the said falls, to give a free and uninterrupted passage to the fish up the same” (47). The regulations were that no one could fish within four rods of the trench with nets or lines from the 1st day of April to the last day of June or in “ any other way or anywise obstruct, prevent or hinder fish from passing and repassing said trench or ditch” (33, 47). This act indicates that as late as 1787, anadromous fish were still using a trench to bypass the Lower Pawtucket Dam, otherwise seasonal fishing regulations in the trench would be unnecessary.

1792 - A petition was filed stating that, “the verry considerable addition [to the dam at Pawtucket Falls], near two feet perpendicular,” will make it “... Totally impossible for the fish to pass up in the future and the additional dam erected the summer past across said River above the falls, which though of less height, will prove an Obstruction of the fish unless proper fish ways be made in the same” (48). A committee was appointed to look into the matter. It was empowered to “...prevent the erecting of any further obstruction.” The committee viewed the obstruction and reported in 1793 that, “it is our opinion that it will not be possible for the fish to pass up said falls over the Additional Dam which has been Lately erected there” (38). The two foot addition in height had been

added to the Pawtucket Lower Dam, with plans for an additional height increase of three feet. The “additional dam” was thought to be the Slater Mill or Upper dam, built in 1792, which was constructed without fishways (49).

At this point, it appeared that it was not a lack of laws, but the failure to enforce the laws that posed the biggest problem to the river fisheries. As noted in a report prepared by the Massachusetts Department of Conservation, Division of Fisheries and Game, “The mere presence of a dam is not dangerous. Only when the dams are unequipped with fishways or are not opened during the spring run, do they become a menace” (50).

1793- A law was passed by the RI State Legislature that obstructions to fish should be removed, except in the case of the newly erected dam at Slater Mill (19). By specifically exempting the Slater Mill dam, this law revealed that the interests of farmers and fishermen were becoming secondary to the mill interests.

1805- The General Assembly agreed to repeal the Act of 1787, which restricted the use of commercial fishing nets below the falls. The commercial fishermen convinced them that this was for the public good. Since the passage of migratory anadromous fish was almost completely obstructed by this date, the sparse remaining population was rapidly depleted through the use of commercial nets (19).

After this time, there was the little mention of anadromous fish in the laws of Rhode Island, another sign that the river fisheries were dwindling, both in number of fish and their importance relative to industry. The river became so valuable to provide power for the mills that the issue of fish was ignored. The laws protecting fish were relaxed and a shift was made to laws favoring industry. Mill owners argued that their need for water power was more important than, “...a trifling shad and alewife fishery [that] does not pay for the grog expended in taking the fish” (51) and that, “leaving dams open for migratory fish would only accommodate a few individuals with an opportunity of spending time in fruitless pursuit after a few scattered Herring”(52). Later laws concerning the Blackstone dealt mainly with issues of water rights.

Dwindling Numbers of Anadromous Fish

Slater Mill marked the beginning of the industrial revolution in America, with a rapid increase of mill and dam construction. By 1830 there was one dam for roughly every mile of the Blackstone, and all tributaries had been dammed. Two dams and four mills, (two anchor shops, one fulling mill and one bark mill) had been built along Sargent’s Trench, “converting what had originally been a fishway to a power canal” (19) and water privileges had been established such that Sargent’s Trench would receive only 7% of the Blackstone’s flow. Figure 6 shows the development surrounding Sargent’s Trench in 1792 and in 1836, illustrating the industrialization of the waterway.

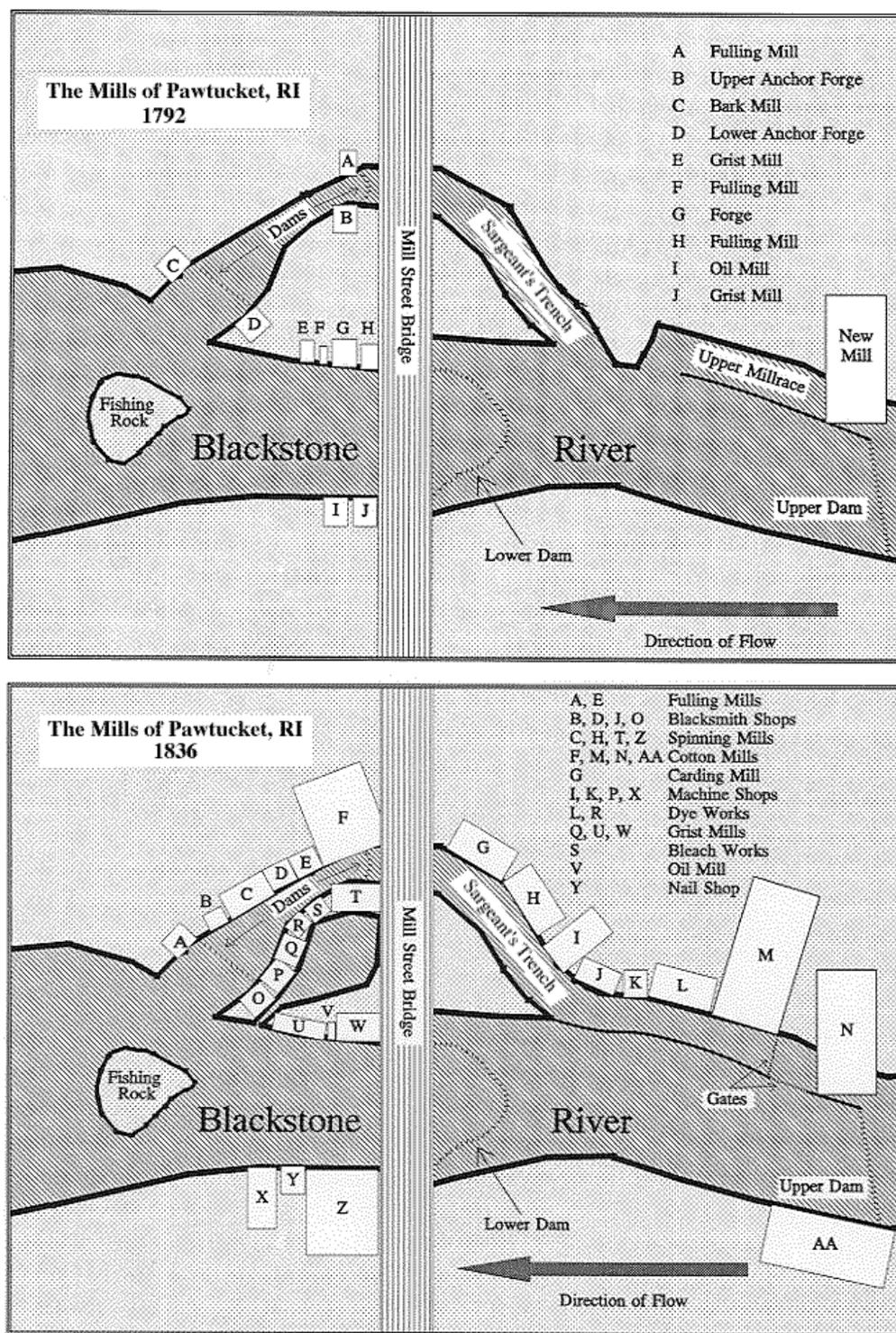


Figure 6. Schematic drawings to scale of the lower Blackstone River in 1792 and 1836, showing Sargent's Trench, from the Lemelson Center for the Study of Inventions and Innovation, National Museum of American History, Smithsonian Institute, c. 1998. Available online at: www.si.edu/lemelson/centerpieces/whole_cloth/u2ei/u2materials/eiPac7.html

As bridges were built and replaced, dams were erected, and fill was brought in for the construction of roads and buildings, the shape, flow, and character of the Blackstone River, its branches, and its streams, changed drastically. The “Fishing Rock” just below Pawtucket Falls which was described in the 1700s as a considerable outcrop of rock in the middle of the Blackstone (11, 38) (note its location in Figures 5 and 6),” today is on the western shore of the river, partially under a building. An arrow in Figure 7 points to “Fishing Rock” in a photograph taken in the spring of 2001.

There were as many as 200 mills located on the Blackstone and its tributaries at one time. Manufacturing wastes were discharged directly into the river. There were no laws limiting water pollution or the dumping of wastes in the river until the middle of the 20th century. It was said that “Fishermen could require that dams be opened at designated times to allow fish to pass through (up or downstream), but they could not obtain laws preventing manufacturers from polluting the streams” (53). Human waste dumped directly into the river also became a major problem as populations grew. As a result, the once “bright and sparkling waters” of the Blackstone (29) had become so polluted that it was considered to be a threat to public health (54).

A quote from the Evening Times sums up the sociological impact,

“The success of the cotton industry in Pawtucket after 1790 changed personal values considerably. Prior to that time, the river was most important for the fish it produced and for the pleasure it provided. After that date, the water power provided by the river and the money it brought far overshadowed any value it had for providing food and pleasure” (55).

Disappearance of Anadromous Fish

By the middle of the nineteenth century, the number of anadromous fish in the rivers had been reduced drastically and, “the salmon could no longer be found in its customary spawning grounds” (19). The salmon population appeared to decline first, probably because of its stringent habitat requirements. Apparently, the shad population disappeared next, as an early report of the Rhode Island Inland Fisheries Commission states, “...[the herring] has endured against the disadvantages man has put in its way better than shad or salmon”(31). A Department of Conservation Report states, “Since the disappearance of the shad, the alewife, or branch herring, the most abundant food fish inhabiting the rivers of the Atlantic coast, has become commercially the most valuable anadromous fish” (56). The herring is considered to be hardier than shad and, although it spawns in quiet lakes and ponds, it is “...also capable of breeding in tidal waters” (31). This ability of the alewife to spawn in tidal waters may have resulted in its persisting longer than the other anadromous species.



Figure 7. A photograph of Pawtucket Falls as seen today. Notice the location of the “Fishing Rock” indicated with the white arrow, compared to its location in earlier schematics in Figures 5 and 6.

The following was written about the Blackstone River by Woonsocket historian Erastus Richardson in 1876:

“But ploughmen instead of poets, artisans rather than artists, have lived, loved and died upon its banks; and during their lives, while diverting its foaming waters to useful ends, they have deprived the lovers of romantic scenery and good fish of much enjoyment” (29).

Restocking

Due to the decline in anadromous fish, attention was given to restocking the Blackstone. The first efforts were sponsored by the Society for the Encouragement of Domestic Industries in 1825 (46). Official attempts to reestablish runs began in 1868 (46). In 1870, when the R I Commission for Inland Fisheries was established, restocking consisted mainly of shad, trout, and black bass (31). However, stocking appeared to be inconsistent, since for a number of years the reports state that, “The US Bureau of Fisheries has been unable to supply your Commission with shad fry because of the scarcity of the spawn” (57). Shad fry were not stocked in Rhode Island waters after 1924 due in part to concerns about pollution (58). These early restocking attempts failed to reestablish self-sustaining populations.

A Few Remaining Fish

There are sporadic accounts in nineteenth and early twentieth century newspapers of shad and herring caught in the Blackstone. Most refer back to the “old days” before the dams and the pollution, when people remembered catching, “...nearly 200 shad in one day” and “...Herring we caught by hundreds” (18). When, “All we had to do was to sweep our nets when we saw the breaks in the water made by the on-rushing fish and intercept them before they could get to the falls” (18). But they also add such statements as, “Fishing with nets just below the bridge is still continued, and some herring have been taken there this spring” (59). Most fish in these later accounts appeared to be caught below the lower dam, but the Pawtucket Times’ Anniversary Edition of 1935 had an article which stated, “A ray of encouragement...was seen last spring when herring were seen above the dam at the Old Slater Mill” (60).

Conclusion

The historical record clearly documents extensive runs of anadromous fish in the Blackstone River. These runs declined with increasing industrialization. Fortunately, today there is a “ray of encouragement” for the return of anadromous fish to the Blackstone River. The water quality of the Blackstone is improving due to efforts made by the RI Department of Environmental Management and others, and plans are being made to provide fish passages at four dams located on the lower portion of the river. Restoring the spawning migrations of the species that historically used the Blackstone and other New England rivers is an ecologically and culturally desirable goal.

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